

TWIN CITY LINES

FALL 2008





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P. O. Box 14467 University Station
Minneapolis, MN 55414-0467
(952) 922-1096
www.trolleyride.org

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Editorial staff

Aaron Isaacs
Editor

3816 Vincent Avenue South
Minneapolis, MN 55410
612-929-7066
aaronmona@aol.com

Sandra Bergman
Production Editor

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The Minnesota Streetcar Museum operates the Como-Harriet Streetcar Line in Minneapolis and the Excelsior Streetcar Line in Excelsior. Its mission is to preserve Minnesota's electric railway heritage.

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CORRECTIONS AND NEW INFO

The photo on page 15 of the Summer 2008 issue shows Bill Olsen with Charlie Sulzbach's mother, not his wife as stated in the caption.

MSM NEWS SUMMARY

See Streetcar Currents for the full story (<http://www.trolleyride.org>)

MSM joins Museum Adventure Pass

As of September, the Minnesota Streetcar Museum is part of the Museum Adventure Pass network. The passes, which allow free admissions to over 20 metro area museums, are issued by 106 public libraries around the metro area on a first-come, first-served basis. Library customers "check out" the pass for one week, then it expires. Each pass is good for two free rides on our streetcars. Macy's funds the program, which includes considerable free advertising in the StarTribune and on KARE11, with our museum name prominently mentioned.

First Pumpkin Patch event a success

Our first ever Pumpkin Patch event on October 24 & 25, gave children the opportunity to ride to the end of the line, get off the car and choose their very own Halloween pumpkin to take home. Member Ken Albrecht grew 300 pumpkins especially for our event. The event was very successful. 500 people rode the first day, sometimes more than could be accommodated on the single car that was running.

Isaacs carbarn sprinklers being installed

Following a successful fund raising effort that yielded \$85,000, work has begun to install a sprinkler fire suppression system in the Isaacs carbarn at Lake Harriet. As this is written, the plumbing of the building is complete. A grading contractor has been hired. When grading is finished, the water and sewer hookup will take place, along with the installation of a new security alarm system. More carbarn improvements will continue next year with the installation of a restroom.

RAIL TRANSIT INSIDER

-John DeWitt

Light rail lines and a commuter rail line serving the Twin Cities region continue to advance pretty much as planned. Here's the latest.

Central Corridor - This light rail line connects downtown Minneapolis and downtown St. Paul running mostly on Washington and University Avenues. On September 5, the Central Corridor Project Office submitted a Full Funding Grant Application to the Federal Transit Administration. Planning continues with construction scheduled to start in 2010 and operations starting in 2014. The University of Minnesota has agreed to a car-free transit mall through the campus on Washington Avenue. There are ongoing discussions about whether or not buses will be allowed.

Southwest LRT Corridor - This light rail line will link downtown Minneapolis to the southwest suburbs,

terminating in Eden Prairie. In the fall of 2008, scoping meetings for the Draft Environmental Statement were being held. The DEIS could be completed in 2009. Preliminary engineering could then take place from 2009 to 2011 with final design and construction between 2011 and 2015. Alternative alignments into Minneapolis and Eden Prairie will be evaluated.

Hiawatha LRT - A new parking ramp at the 28th Avenue South station recently opened providing nearly 1,000 additional parking spaces. Work continues on the 5th Street extension to the new intermodal station serving the Northstar Corridor commuter rail line. Trackwork is in various stages of completion from the Warehouse District Station to a tail track alongside Olson Memorial Highway / 6th Avenue North just east of Metro Transit's Heywood facility. The station serving the Twins' new ballpark is also taking shape.

Hiawatha ridership for the month of August came in at 1,039,066. Average weekday ridership was 36,503; average Saturday ridership was 32,084; average Sunday ridership was 22,418. Not bad for the train to nowhere.

Northstar Commuter Rail - This line uses existing BNSF trackage to serve communities from downtown Minneapolis up to Big Lake. A maintenance facility in Big Lake is nearly complete and work on stations along the route continues. A platform is in place under the 5th Street bridge in downtown Minneapolis and trackwork is beginning. The first MP-36 locomotive from Motive Power, Inc. of Boise, Idaho arrived in early October.

Front cover: Dave French and Jim Vaitkunas monitor eBay for Minnesota streetcar photos and artifacts. This excellent photo became available recently. It shows a northbound Jackson Street car crossing the bridge over the Great Northern just west of the Jackson Street Roundhouse in 1918. The GN car shops begin at right and the State Capitol dome is visible in the distance.

Inside front cover: The camera is looking east on Washington Avenue at 2nd Avenue South about 1900. The Milwaukee Road depot train shed is visible at left. The overhead wire is suspended from ornate center poles, later replaced by span wire. Look closely at the closest car and you can see the mail box (arrow) hanging from the wire mesh partition behind the rear gates. See page 17 for more about TCRT carrying the mail. Minnesota Historical Society collection.

The remaining four locomotives should be delivered by the end of 2008 and delivery of 18 Bombardier passenger cars will begin next spring. Service is expected to begin in late 2009.

Streetcars - Your author, along with your editor, have joined a project studying the feasibility of streetcar line in the Midtown Greenway. At the first meeting, held in mid-October, it was decided to analyze previous studies in order to evaluate ridership and cost estimates. The Midtown Greenway is the former Milwaukee Road trench across Minneapolis just north of Lake Street and is now a popular bike trail serving as many as 3,700 bicyclists a day. The right-of-way was purchased by Hennepin County for future rail transit. The four-mile streetcar line would link the Lake Street/Midtown station on the Hiawatha light rail line with the West Lake Street station on the SW LRT line.

CTIB - There's a new kid on the block. Earlier this year, the Minnesota legislature authorized the seven metro area counties to establish a Counties Transit Improvement Board. The five counties that chose to join are authorized to levy a sales tax which should raise about \$100 million a year for the construction and operation of transitways - primarily light rail and commuter rail lines. Previously, the state was expected to provide 1/3 of the funding for rail corridors, a funding source that was never certain. Now CTIB will provide 30% of a project's cost, the state and the Regional Railroad Authorities 10% each, with the Federal Transit Administration providing the final 50%. This is the first time that the Twin Cities region has had a dedicated funding source for light rail and commuter rail lines. CTIB funding proved critical in keeping the Central Corridor light rail line moving forward.



At right are two of the high school student conductors who worked at Lake Street Station during World War II. Harold Dalland photo

High School Conductor

-D. W. Swedburg

Mr. Swedburg attended a book signing event for Twin Cities by Trolley in 2007, and followed up with this account of his experience as a high school conductor during World War II.

I do have fond recollections of my days as a 16-year old conductor on Selby-Lake. I've learned that my memory is not always accurate, so take that into consideration.

I was required to join the Union, pay an initiation fee, pay dues, etc. There was some resentment by old timers that 16-year-old high school students received the same hourly rate as others.

To change the direction of a switch, we used switch rods or power switching (second notch on the controller to throw the track switch, coast with no power to not throw it). Anyway, well after midnight with the temperature about 20 below, while backing at the wye on Prior and Marshall, the rear truck derailed and I had to repeatedly place the rerailling

frog behind a rear wheel to guide the truck back on the track while the motorman applied power ever so carefully. It probably only took about 10 minutes, but with no gloves it seemed like hours.

With the World War II manpower shortage, many old-timers delayed their retirement, so I recognize several of them on in the Twin Cities by Trolley inside-cover 1921 photos. I'm pretty sure J. Rolhoff had top seniority at the Lake Street station and always picked the day run on the Ft. Snelling shuttle line — known as the "Dummy" line — no fares, no transfers, and no traffic to deal with. I think F. Anderson was my trainer (I think trainers received extra pay). He was a charming gentleman — used to be on the Minnetonka line (I still count coins the way he taught me — finger 3 then 2, 3 then 2, 3 then 2, while counting 5, 10, 15, etc.).

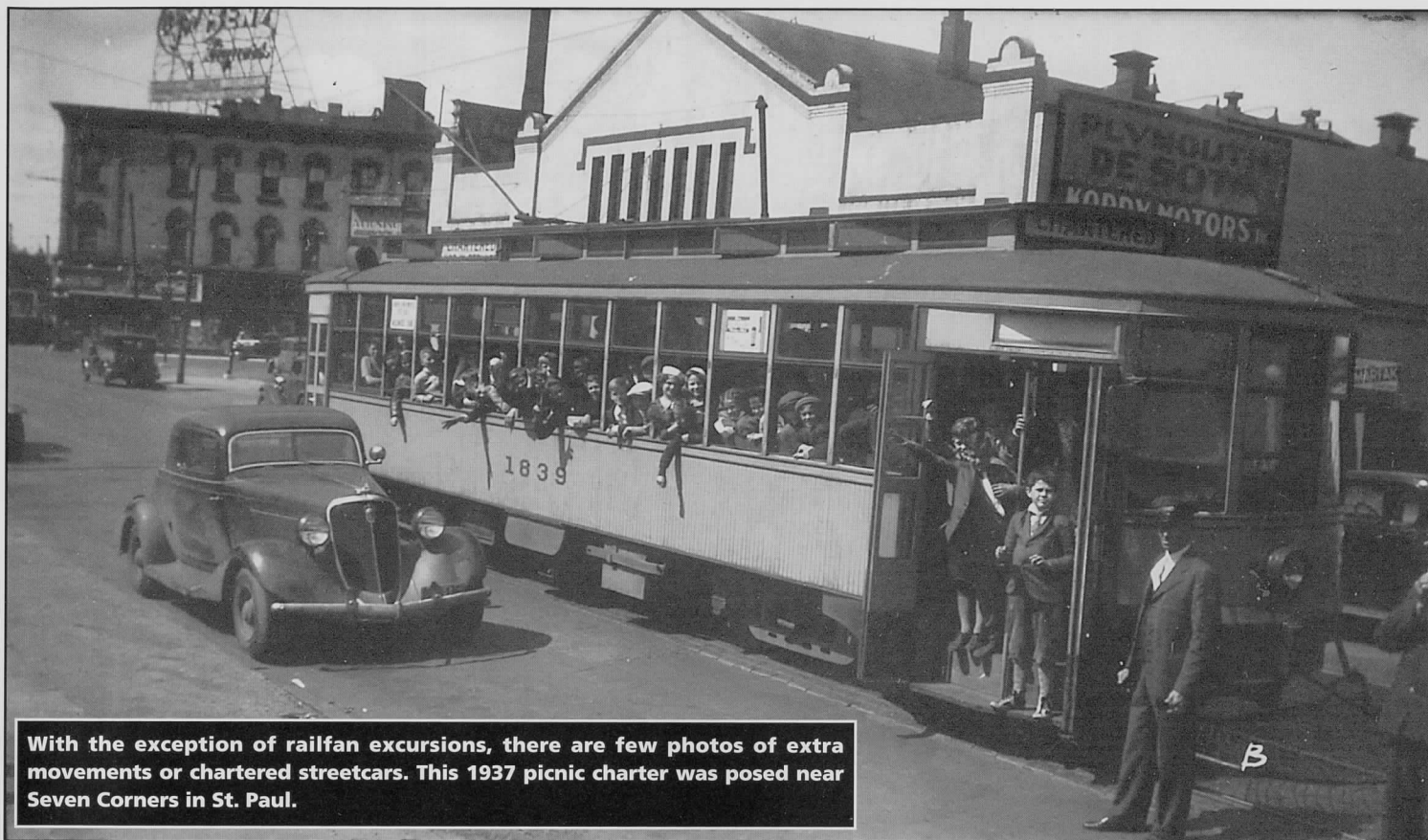
When I soloed the first time, by the end of the 3 to 11 run my pockets were stuffed with dollar bills and I had transfers coming out of my ears. The car was packed all night long. There was a hazing tradition for the first run

of a fledgling conductor — the motorman deliberately ran late the whole run — no time for layovers at the end of the line — just turn around and continue the behind-schedule dashes to the other end of the line.

There was a bit of resentment of boy conductors and Mr. Adamson gave me the full treatment. Early in the run he only had to go a minute or so late to keep the car at standing load — but as the evening wore on and passenger traffic slowed down, he had to go more and more behind schedule to keep the car full. After a while the car behind us was right on our tail and at one time there were two cars right behind us (during the war there was less than a minute service on Selby-Lake during rush hour, then three minutes, then five, etc.) Sometimes if no one rang the bell to get off at the next stop, we just passed up the people waiting on the corner — there was no more room on our car. Toward the end of the run I thought I saw the motorman and conductor of the car behind us laughing as we passed them going the other way — but I didn't have a clue.

The first time I saw the motorman was at the end of the line in St. Paul before the last leg back to the Lake Street station when he walked to the back of the car to sign the trip sheet (when we relieved the other crew at 22nd & Lake I boarded the rear of the gate car and not until the last minute did he scoot out of the station and into the motorman's cab).

When he saw my name on the trip sheet, he asked if I had relatives in Moline. I said yes and he asked my father's name and I said, "Oscar." He had tears in his eyes as he put his arm around my shoulder, and said, "I'm so sorry — your dad and I were boyhood friends — and I just put you through hell."



With the exception of railfan excursions, there are few photos of extra movements or chartered streetcars. This 1937 picnic charter was posed near Seven Corners in St. Paul.

EXTRA SERVICE

-Aaron Isaacs

TCRT didn't run streetcars at random. Most were scheduled. Schedules were designed to deploy just enough service to each line, but not too much. However, schedules couldn't anticipate periodic, unpredictable spikes in service. Large group movements could overwhelm the regular cars. TCRT responded by running extras.

These took four forms. The first was to simply add extra trips that supplemented the regular service. The second was to substitute an existing schedule with more service (Saturday for Sunday, weekday for Saturday). The third was to write a new schedule with more service that would be substituted

for the regular schedule. The fourth was to run an unscheduled charter that could travel its own unique route.

A review of TCRT Schedule Department records from 1905 to 1927 reveals many examples of extra service.

The State Fair was probably the largest recurring event. In later years only the Como-Harriet and Snelling Avenue lines, which served the fair directly, received extra service. In the early years, however, the fair resulted in special augmented schedules on almost every line in the system.

Today Metro Transit operates Sunday schedules for the holidays of New Years Day, Memorial Day, 4th of July, Labor Day, Thanksgiving and Christmas. For the same holidays in the early 1900s, TCRT assigned a mix of weekday, Saturday and special

schedules to each line, depending on how much service was needed.

Decoration Day, now known as Memorial Day, saw terrific demand to visit cemeteries. Most lines ran with special schedules on the 4th of July because of surges to attend parades and fireworks displays. In the records, the week before Christmas is referred to as "Holiday Week", and like Decoration Day each line received a different weekday, Saturday or special schedule based on demand.

To handle New Year's Eve revelers, the hourly late night Owl cars were double- and triple-headed between midnight and 3 AM.

July 4, 1916 was particularly heavy. Apparently on that day the streetcars hauled a total of over 115,000 people to these places.

Lake Minnetonka	18,667
Twin Cities Speedway	7500
Wildwood Park	11,000
Phalen Park PM	5,000
Evening	4,000
Ballgame AM	3,500
PM	3,500

(probably a Saints-Millers double-header at Lexington and Nicollet Parks)

Forest Park	1,800
Lake Harriet PM	6,000
Night	10,000
Ft. Snelling	15,000
Como Park PM	8,000
Night	10,000
Glenwood Park	4,000
White Bear	2,800
Lake Nokomis	800

Things didn't go well that day, hence the following note: "Owing to varied attractions during day and shortage of crews it was impossible to provide sufficient service, however cars were distributed as evenly as possible-The Speedway attraction was the main event of the day but was poorly attended and owing to power conditions and shortage of crews, service provided was poor, especially out of St. Paul, where a 5" service was the best we could possibly run. At the break at 515 PM the Booster at Minnehaha Sub-Station blew up and left the Speedway stranded and it took 3 hours to finally clean up crowd."

Here are additional examples from the TCRT Schedule Department records:

August 13, 1906: Grand Army of the Republic gathering.

On Election Day in 1910, the 1 AM and 2 AM owls were double-headed on ten lines.

July 25-30, 1910: Golf tournament on the St. Louis Park line

Nov. 28, 1910: Six extras were added to the Selby-Lake to handle the shoppers.

May 29, 1911: Lake Street extras from 33rd Ave. to Hennepin to handle



A chartered car, circa 1900, at an unknown location.

Dec. 25, 1919 Extras added for morning church services
 Dec. 24, 1920 Extras for midnight church services
 Feb. 5-12, 1921 Auto Show at Northwest Terminal. Extras on North West Terminal line.

Passengers carried:

Saturday	2-5	4746
Monday	2-7	5440
Tuesday	2-8	6258
Wednesday	2-9	10,409
Thursday	2-10	11,182
Friday	2-11	8,970
Saturday	2-12	7222
Total		54,227

Oct. 8-15, 1921 International Dairy Show at State Fairgrounds. Como-Harriet ran every 3 minutes, Snelling Ave. every 12 minutes.

Mar. 20-22, 1922 Builders Show at Minneapolis Armory Extras on Nicollet, Bryant, Como-Harriet

June 6-9, 1925 Norwegian Centennial at the State Fairgrounds, special schedules on Como-Harriet and Snelling lines.

Sept. 21, 1930, War games at Ft. Snelling.

Mar. 11-13, 1936 Land O' Lakes convention at North West Terminal.

Sept. 20, 1936 Father Coughlin at Fairgrounds.

Jan. 30-Feb 6, 1938 Ice Palace at Mounds Playground, extras on Maria.

Jan. 28, 1939 Winter Carnival, extras on most St. Paul lines.

June 22-26, 1941 National Eucharistic Congress at Fairgrounds

July 12-20, 1941 2nd Aquatennial, extras to Glenwood Park for Aqua Follies show, parade extras

May 17, 1942 I Am An American Parade, 12-2 PM both cities, 141 extra streetcars and 18 buses.

June 23, 1946 Swedish Picnic at Minnehaha park, extras on Minnehaha, Lake St.

Wonderland amusement park traffic.
 May 30, 1912: Special service was run every 5 minutes from Lake & Hennepin via Lake Street to Minnehaha Falls Park.

June 21, 1913: The new Calhoun Beach bathhouse opened. TCRT built a new wye at Lagoon and Holmes so it could run summer shuttle extras between there and the beach.

July 21, 1913: Barnum & Bailey Circus at 26th & Cedar

July 23, 1913: Barnum & Bailey

Circus at Hamline & University

May 16-18, 1914: Norwegian Centennial at the State Fairgrounds, special schedules on 6 lines.

June 11, 1914: Extra on several lines for old Central High School (graduation?)

June 24, 1915: 2500 people attended Wennerburg statue unveiling at Minnehaha Park. 5 minute service operated all day.

Sept. 4, 1915 Speedway near Ft. Snelling opened. Special schedules on most lines.

June 29, 1916 National Guard Encampment at Ft. Snelling.

Feb. 3-10, 1917 Auto Show at new Mazda Plant at Broadway & Central, added service on Central Ave. and Broadway lines.

Fair Week 1917, 382,203 passenger carried.

Apr. 20, 1919 Easter Sunday extras on Selby-Lake

Apr. 21, 1919 Flying Circus at Ft. Snelling, extras from both cities.

Sept. 21, 1919 Cemetery Day, all Chicago cars extended to 46th St.



This unknown group chartered a bunting-filled car to Wildwood Park, where they posed on the station steps.



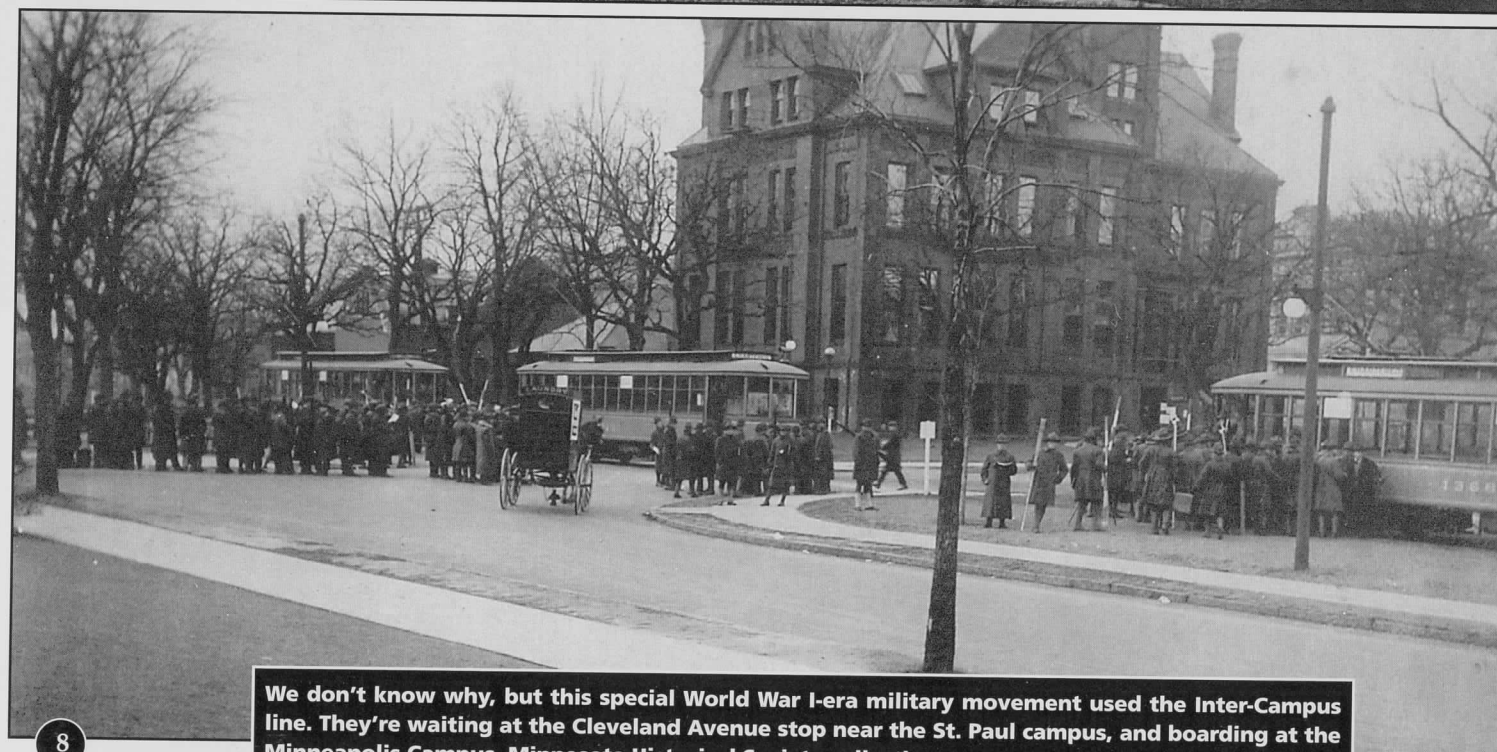
Every afternoon, a special streetcar left the Snelling Shops with day shift workers, traveling to Lake and Hennepin via the Selby-Lake line.



A University of Minnesota football special prepares to leave the 44th and France loop.



As late as 1953, State Fair specials via the Oak-Harriet line were dispatched from the 50th and Penn wye in south Minneapolis. Arthur Rusterholz photo.



We don't know why, but this special World War I-era military movement used the Inter-Campus line. They're waiting at the Cleveland Avenue stop near the St. Paul campus, and boarding at the Minneapolis Campus. Minnesota Historical Society collection.

As the following table shows, charter miles peaked in 1919, were cut in half by the onset of the Great Depression, and declined thereafter.

TCRT Charter Car Miles

Year	Mpls	St. Paul	Suburban	Total
1909	6,695	4,581	6,923	18,199
1910	4,628	3,801	6,446	14,875
1911	4,281	3,767	6,498	14,546
1912	3,502	3,989	3,391	10,882
1913	3,641	3,377	3,184	10,202
1914	5,056	3,441	5,761	14,258
1915	3,082	3,975	2,907	9,964
1916	4,127	4,361	2,420	10,908
1917	3,770	4,846	2,258	10,874
1918	6,161	5,381	5,685	17,227
1919	7,666	7,546	8,590	23,802
1920	5,740	7,139	7,170	20,049
1921	4,457	4,875	4,041	13,373
1922	3,967	5,176	4,185	13,328
1923	5,051	5,310	4,504	14,865
1924	3,527	3,985	3,037	10,549
1925	4,096	4,784	3,750	12,630
1926	3,223	4,424	3,425	11,072
1927	2,515	5,488	2,984	10,987
1928	2,887	4,856	2,774	10,517
1929	2,866	6,663	2,992	12,521
1930	4,643	5,464	2,391	12,498
1931	2,301	2,503	969	5,773
1932	3,292	2,101	907	6,300
1933	1,888	1,258	141	3,287
1934	600	1,334	204	2,138
1935	4,582	5,186	363	10,131
1936	216	1,348	474	2,038
1937	347	1,700	554	2,601
1938	302	992	84	1,378
1939	474	755	0	1,229
Total	109,583	124,406	99,012	333,001

POLES AND WIRES: TROLLEY OVERHEAD OPERATION

-Tom Fairbairn

The study of streetcar/trolley/tram overhead and its relationship to the current collectors on the cars is a study of almost infinite variables, which leads to an equally broad spectrum of how overhead wire is

installed and show the cars using it are configured.

Running a streetcar along a tangent track is both straightforward and boring. The wire runs down the center of the track, supported every 100 to 125 feet by some form of span wire or crossarm, and the wheel or sliding shoe at the end of the trolley pole dutifully follows the wire along the way. Nothing very interesting or earth-shattering there. As long as the pickup device has flanges to guide it, the wire supports don't stick out to interfere with that device, and the supporting hardware is reasonably straight, the pole can either trail a car or back-pole (get pushed ahead of the car) without problems.

However, when the overhead encounters curves, grade crests or valleys, and track divergences, the picture changes radically. Suddenly, how and where the wire is hung has a profound effect on how reliably the pole tracks the wire, and is very contingent upon how the cars running under that wire are configured for pole arrangement.

Trolley poles came in standard lengths (12, 14, and 16 feet; some 18-foot poles were also used) and with several varieties of stands and collection devices.

Over the years, the experimenting with the stands resulted in several models that maintained the upward force of the poles at a nearly even tension from full down (flat with the car roof) to full up (at an angle of 70 degrees or more to the car roof). The stands had varying arrangements of adjustments to set pole upward force and in some cases upward and/or downward limits of motion. Some had lockdowns at the stand that would hold a pole flat to the car roof in the absence of pole hooks, used when towing dead cars. There were various arrangements to ensure the pole stand could pivot freely in most or all of a full circle so as not to provide a

sideways force when the pole swings to the side.

A number of pole stands were introduced beginning with the first successful system used in Richmond, Va., in 1886. The stands used on the Richmond cars, unlike later developments, used poles mounted on a long stalk and counterweighted to hold the wheel to the wire. There were no springs, but the counterweights added a great deal of inertia to the poles when they tried to follow the wire through turns and switch frogs. Most later designs used some form of spring arrangement to hold the poles raised. The most common stand used in the world was the Universal Standard (U.S.) #13, which had four springs and a lockdown arrangement. Other stand designs (there were several U.S. versions) used anywhere from one to four springs, and springs either in compression or tension. A few were "flipover" types to reverse the pole rather than swinging it around in a circle. PCCs have a unique stand design that uses two springs, and is rather narrower than the U.S. #13.

Pole stands were mounted in several locations on various cars and owning companies. Most lines generally mounted the pole stands to be nearly directly above the car body bolster on double-truck cars, or close to the center of single truck cars. The objective was to have the pole pivot at a point that remained as close as possible to the center of the track, without having it extend excessively beyond the ends of the cars. Ideally, this point would be directly above one or the other axle of the truck. This is because as the car moves into a curve, the bolster center (between the wheels) tends to move inward toward the center of the track curve, even if only slightly. This is more pronounced on four-wheel cars, which have a longer wheelbase. Because of the body swing of double-truck cars on curves, if the pole is



Two views of a standard TCRT trolley pole stand, showing the wire leading to the motorman's compartment. Note the spare trolley pole carried by all cars.



mounted directly over an axle, the stand moves either inward or outward slightly from track center as the car rounds the curve. With four-wheel cars or any car with the poles centered on the body, the effect on the pole centering to the track can be much more pronounced.

The object of the whole arrangement is to have the wire run as nearly parallel as possible to the flanges of the pickup device at all times. Any rotational displacement to the sides causes binding, noise, and a possible tendency of the pickup to "climb" off the wire. It has a very strong influence on the wear of the trolley wire and the pickups. Maintaining this parallelism through a curve depends upon the radius of the curve, location of the pole stand, the length of the pole, the height of the wire, number of pullovers, the amount of lean, or tilt, of the carbody resulting from super-elevation of the track, and any unevenness in the track lining. Simply because poles don't habitually fall off the wire is no guarantee that proper operating conditions are being met.

A little experimenting shows what a tremendous problem can be involved in this system. Draw a couple of larger and smaller arcs on a sheet of paper. Make two or three rectangles to represent various car lengths.

Scribe marks to indicate where the pole stands could be located on each car and stand position. Cut two or three lengths of wire or broom straw to represent various pole lengths and elevations (the higher the pole elevation given a specific pole length, the shorter the effective distance between the stand pivot point and the pickup). Now move the rectangle sideways to get the end of each pole to be parallel with the curved line when the other end is at the various possible stand locations. The position of the car body rectangles relative to the arcs will show how great an offset would



Most single truck cars had a single pole centered on the roof so it could follow the truck easily around corners. Above: At the Duluth carhouse, the two cars in the foreground are identical to MSM's car 78. Opposite page: A Mankato streetcar turns from Main Street onto Front Street. Minnesota Historical Society collection.

have to be applied to the overhead on curves to maintain proper pickup alignment to the wire. Various combinations of arrangement will result in very noticeable variations in the wire placement on curves.

This is one reason why when cars were transferred from line to line, the new owners sometimes had to play with stand locations, pole lengths, and so on to get them to work successfully on the new owner's overhead.

A similar situation exists between sliding shoes and wheels. Wheels

generally tend to have a shallower flange than sliding shoes. However, when the arc of the wheel flange is considered, its length along the wire is generally quite a bit longer than with sliding shoes. For this reason, wheels generally tend to have more problems at sharp bends in the wire, such as at support and pullover ears on curves, than do shoes. Wheels also will tend to climb off the wire more easily under these conditions, since the flange is a form of ramp leading to the apex of the flange's curve, whereas shoes are quite

boxy and tend not to climb.

These differences also affect the wire frogs used at switches and crossings. Especially with switch frogs, wheels need a fairly shallow runner leading into the frog and not extending very far into it, so the wheel can run on its flanges through the frog with little guidance and a smooth surface. Shoe-type frogs, on the other hand, use very deep runners to prevent the flanges of the shoe from riding on the frog at all, and runners that extend entirely through the frog to maintain that

spacing throughout. Grooves are cut diagonally through the straight through runners to allow the shoe flanges to make the transition to the diverging side of the frog.

Wheels can't follow this because of the shallower flanges, longer side contact with the overhead, and the tendency to ramp. Large wheels have more problems with this than small ones, but small ones still don't work well with shoe frogs.

Wheels came in various sizes, groove dimensions, and base materials. Some had inserted bearings and others were simply machined to fit the axle. Large wheels tend to run more smoothly along well-maintained wire, but don't work as well where the wire is not straight or has sharp bends at the pullovers and support ears.

They have the disadvantage of being heavy, requiring more effort on the part of the trolley stand when holding the pole up, and when pivoting through turns as the bearing loads are higher. The higher inertia can cause problems if the pole starts to bounce for any reason. Smaller wheels work better where the wire is not as smooth, but require more frequent lubricating and replacement than large wheels because they have to spin much faster as the car moves. Because they are lighter, they don't affect the ability of the pole to follow wire displacements as much as do large wheels.

Sliding shoes are of a couple of different basic types. Some are simply a machined piece of brass, iron, or bronze, mounted in a harp that allows them to pivot forward or back so the groove bottom remains flat to the wire. Others (called "graphite shoes") are made to hold a carbon graphite insert, similar to a motor brush, which forms the contact surface and helps lubricate the sliding of the shoe along the wire.

A very few lines in the US used wheels or shoes with pivoting harps, similar to trolley bus pickups. This was



much more common outside the US, however. Pivoting the pickup makes it easier for the wheel or shoe to follow lateral changes in the wire direction. However, the pickups don't always track well through switch frogs.

Shoes need to have more of a twist to the through wire in order to follow the diverging wire through the frogs, so with shoes the frogs are generally further along from the switch points toward the track frog than would be the case with wheel frogs. TCRT originally engineered and built their own overhead components, including switch frogs. These had a 12.5 degree angle of divergence and were mounted nearly over the center of the switch points. When they later went to larger wire and

purchased Ohio Brass fittings, those frogs had a larger divergence angle. They were put closer to the point of the rail frog, about 1/3 of the way from the switch points to the rail frog.

Because of these differences, TCRT stayed with the large wheels on their PCC cars because their overhead was set up for this type of pickup. To go with shoes would have required a massive and costly effort to re-engineer the overhead to accept the shoes. The two types of pickups simply didn't work well together, especially when the entire overhead system was engineered for one type of pickup or the other. Where there was a mixture, compromises in the overhead construction were necessary, and were

not always entirely successful. TCRT was unwilling to compromise the reliability of their overhead system in the name of progress. TCRT did experiment with sliding shoes, but TCRT was not happy with the results of the experiment.

Something seldom mentioned is the fact of overhead wire lubrication. While a few (mostly small) lines ran a dry wire, others (including TCRT) did in fact grease the wire on a regular basis. TCRT had work crews out every night lubricating a portion of the overhead. The entire system was completed every few days. Various properties each had their pet lubricant, generally some mixture of black graphite and heavy grease or oil.

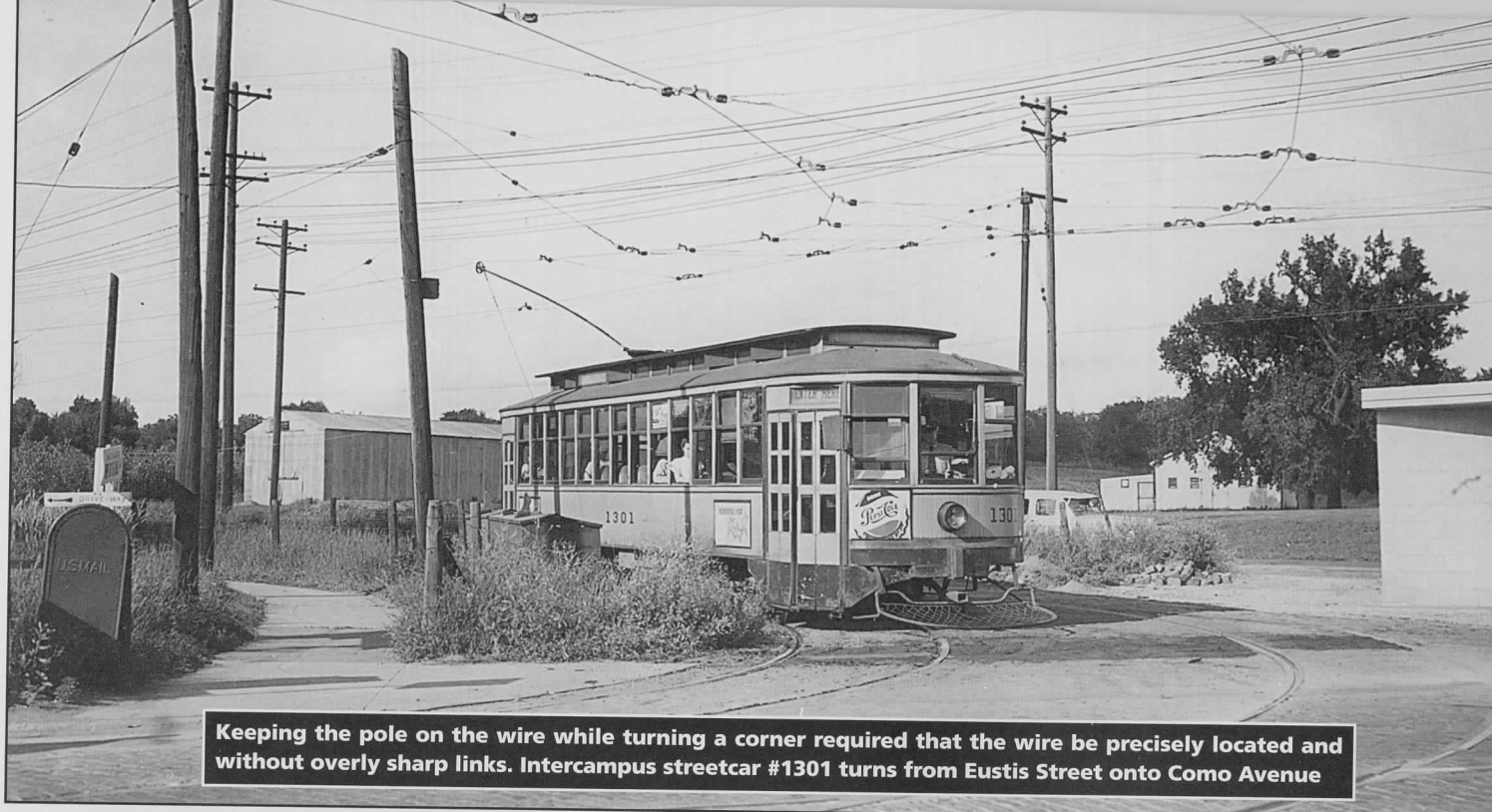
While the sliding "graphite shoes" provide a modicum of self-lubrication, wheels do not. Keeping the wires lubricated has several advantages. First, it reduces the wear of the ears at hangers and pullovers, and even on the straightaways along the sides of the wire, where the wheel flanges touch while running along. It reduces arcing, because the contact areas of the wire otherwise oxidize quickly and that oxide doesn't conduct well; therefore, lubricating increases wheel/shoe life. By reducing friction of the wheel flanges and shoes, it reduces wire "singing" as the cars move along.

One huge factor is that sleet and freezing rain cannot adhere to a lubricated wire as tightly as to a dry one. In our climate, this can be critical. Any line (Pacific Electric was one) that ran shoes without graphite inserts required frequent lubrication of the overhead. Their lubricant sticks were about the shape and size of an elongated bar of soap, and applied using a special shoe on a lubricator trolley pole mounted to a work car.

While the fact of wire lubing runs on TCRT is documented, what lubricant was used is still a matter of conjecture. Photos taken of Wire Cars #3 and 4 in the 1950s show a trolley base, mounted just ahead of the usual one, that was used for the lubricator pole. I doubt there are any photos that show that operation being performed since it was generally carried out (as was much track and line maintenance) in the wee hours when most of us were asleep, and lack of light would have made working photos unlikely at the time.

Used by other companies

Filtration Plant Ry.	small wheel
Winona	small wheel
Mesaba	small wheel
Moorhead	small wheel
Duluth	large wheel
MA&CR	large wheel
St. Cloud	small wheel



Keeping the pole on the wire while turning a corner required that the wire be precisely located and without overly sharp links. Inter-campus streetcar #1301 turns from Eustis Street onto Como Avenue



TCRT line cars traveled the system regularly to grease the overhead wire. Cars 3, 4 and 5 were equipped with an extra trolley pole base for the greasing pole ahead of the regular pole. The base is visible in these photos. When not greasing, the special pole was removed.

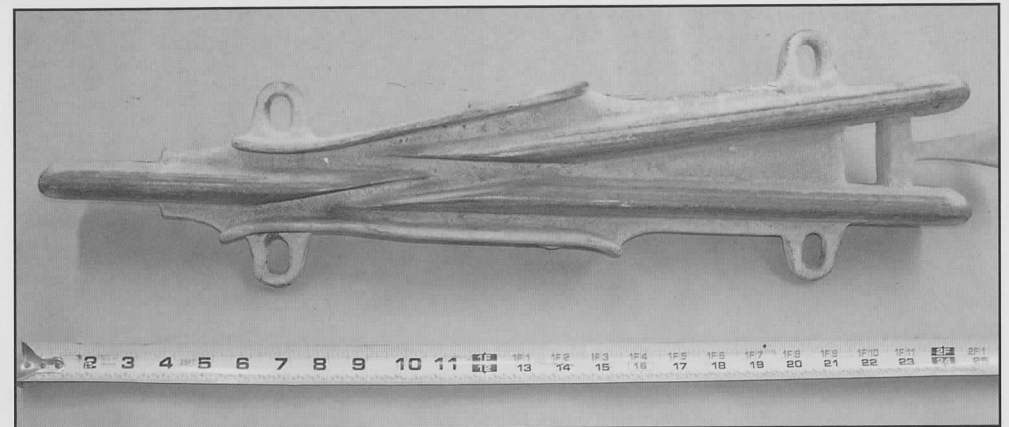


PCC #304, sporting a different trolley pole base, turns from 5th Street onto Robert Street in downtown St. Paul, Minnesota Historical Society collection.





This derailment on Rondo Street at Griggs Street illustrates how sharply the car could turn and still keep its pole on the wire. St. Paul Pioneer Press photo. When backing against the pole, especially through wire frogs, it was generally a good idea to keep a hand on the rope in case of a dewirement. Edwin Nelson photo.



The top photo shows a typical switch frog made for use with sliding-shoe trolleys. Note that the "runners" cast into the frog extend all the way across, and are quite deep to keep the shoes from riding on their flanges through the frog. The diagonal slot through the straight runner is where the shoe can swing to go onto the diverging wire. The wire fingers are not attached to the ends of the frog in this photo. The straight-through wire passes through the fingers at both ends and over the top of the frog casting without a break in the wire, so the frog can be positioned by sliding it along the wire. The diverging wire also passes through a finger, then goes to an insulator beyond the frog and is guyed to a line pole. The U-shaped ears are for attachment of span wires or guys that hold the frog in lateral position over the track and keep it from tipping. There are also clamps on the top that hold the frog and wires in position once the adjustments have been determined. The side guides are only found close to the runner crossing, less than half the length of the frog casting.

The other frog is for use with trolley wheels. Note that the runners are relatively short and shallow, and allow the wheels to roll through the pan of the frog on their rims. Otherwise, the mounting and adjusting facilities are the same for both frogs. This was the type of frog universally used by the TCRT once the trolley wire size had been increased from 2/0 to 3/0 in the 1920s. Again, the fingers are not attached in this picture. Also note the side guides on this frog run the full length, unlike with the shoe frog. Both of the pictured frogs are cast iron, and are for use with a right-hand switch.

GROWING UP WITH TROLLEYS

-Forrest Johnson

The late 1940's and 1950's was a great time to be a kid in north Minneapolis. We could roam the neighborhood, bike to Camden, play flashlight tag at night... we were really free and safe. The things I did as a kid then could not be done today... I rode trolley cars!

My maternal grandparents never owned a car... they took public transportation. So, when they took me places we were riding trolleys, busses or railroad cars. My grandfather worked for the Soo Line and walked to work every day to Camden Place. He got passes to take us to Duluth and beyond. Locally my grandmother would take me downtown on the Chicago-Fremont streetcar line or the Lyndale bus. During the State Fair we would always go by trolley.

When I grew older, eight or nine, they let me venture out on my own. I remember my mother putting me on the streetcar to go downtown to meet my grandmother who worked downtown. So, I would ride the car downtown, get off and walk a couple of blocks to where she worked at the Credit Bureau. She would then take me out for supper at the Forum Cafeteria on 7th Street between Hennepin and Nicollet. I enjoyed pushing my tray along the cafeteria "rails".

My mother remembers riding to Anoka on the Anoka line with her parents. She walked across the Camden Bridge and caught the car to Anoka.

My parents would also let me go out for trolley rides, which usually ended up on the Como-Harriet or Oak-Harriet lines. I liked riding out through the back yards and the lakes. I would stand on the back platform and as the cars would leave the city streets they would speed up and begin to "rock



A youthful Forrest Johnson at left.
Forrest Johnson collection

and roll". I will never forget the smell of the ozone and brakes. Also, the "gear whine" of the old cars was music to my ears. I never liked riding the new PCC's because they were quiet and didn't smell! They even started letting me take my younger brother on these trolley adventures.

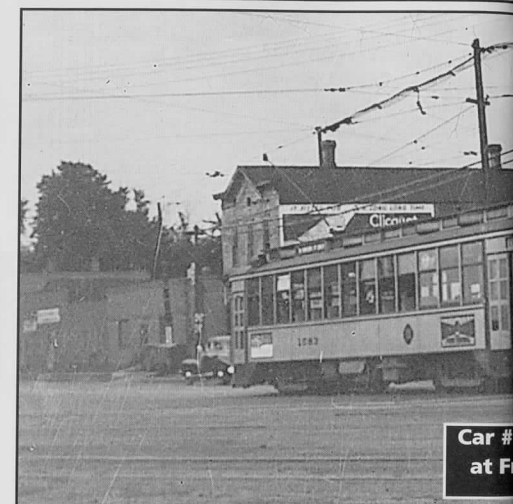
I invented a game of seeing what I could do on one fare. I would leave the north side on the Chicago-Fremont line and ask for a transfer. I would then ride the car to 38th St. and take the crosstown bus (asking for a continuation transfer) to either the Nicollet or Bryant-Johnson lines and ride them back to Northeast Minneapolis where my parents would pick me up (pre-arranged). My other grandmother lived in Northeast Minneapolis. This was all great fun for a kid.

Probably my greatest adventure happened on one of my trips out on the Como-Harriet. As we approached the loop at 44th and France the car did not stop as it always had in the past. The car continued westward much to my surprise. I ran forward to the motorman and asked what was happening. He informed me that we were going to Brookside. The car went quite fast as no one was on board except me and the motorman. When we got to Brookside the car stopped briefly. The motorman did not make me pay extra (there was an extra fare to go beyond the city limits). I put my regular fare in for the return trip and we were off again. We did pick up some passengers on the return trip to the city. I will forever remember that ride even though I was quite young.

A few months after I became eleven years old the streetcars were all replaced by busses and my streetcar riding days were over. I became a trolley modeler and a collector of photos of TCRT. After completing high school and college, and after a few job changes I moved to Big Bend, Wisconsin. When first arriving I was driving around nearby Mukwonago and looked up and saw trolley wire... hard to believe! Not sure how or why this happened, but I am now a volunteer at the East Troy Electric Railroad and quite often I am motoring TCRT 1583, which just happened to spend time on the Chicago-Fremont Line out of the Northside Station. Also by chance, I found a photo of the 1583 in service on the Chicago-Fremont Line... so it is not just "Growing up with Trolleys", but also "Growing old with Trolleys"! It has been quite a ride!

Car #1583, as restored at East Troy. Scott Patrick Photography, East Troy Electric Railway Museum.

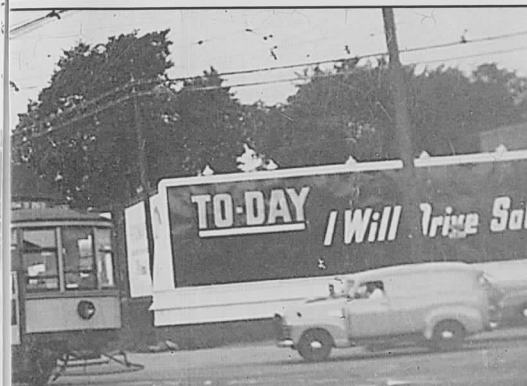
Car #1443 sits on the wye at 44th and N. Fr



Car #1583 at Fr



Front Avenue



1983, now preserved at East Troy, WI, in service
Franklin Avenue and Cedar Avenue, about 1950



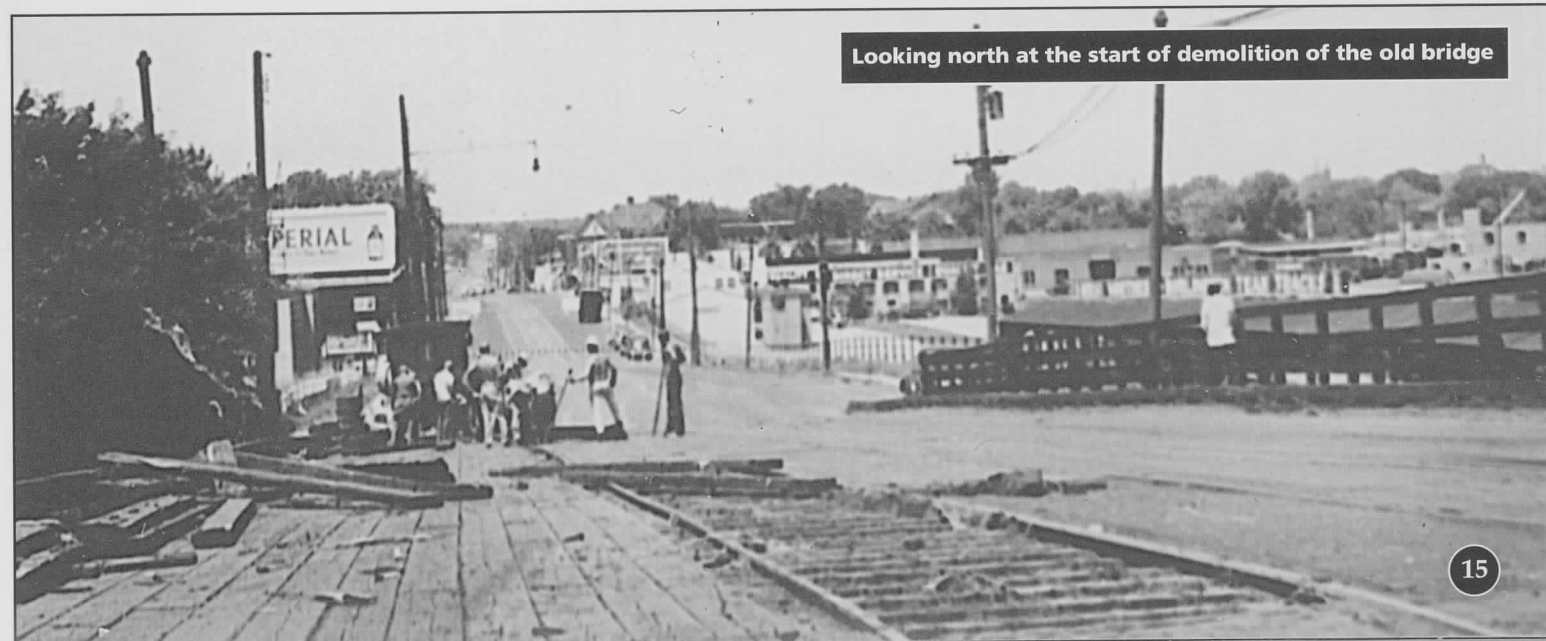
A Central Avenue car crosses Broadway on the original bridge, probably around 1915

REBUILDING BROADWAY AND CENTRAL

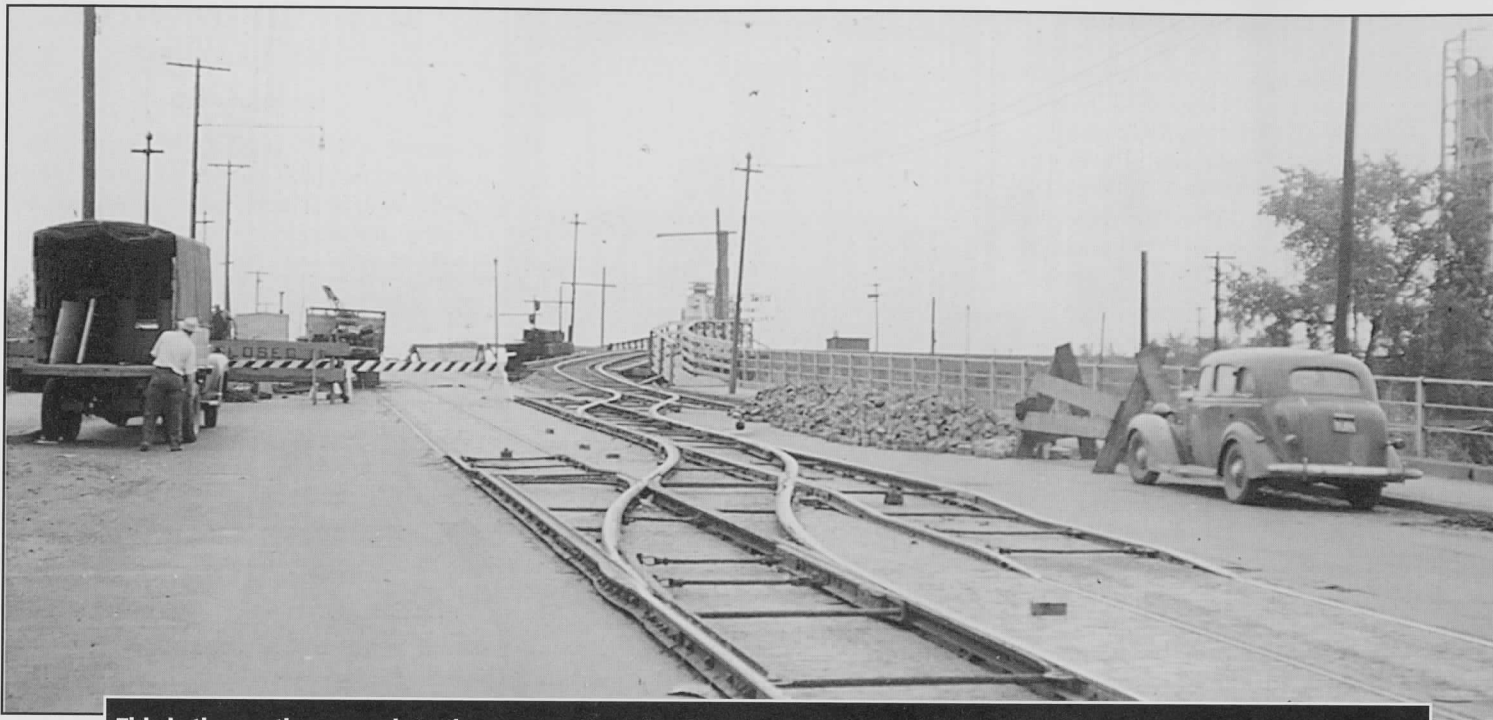
The intersection of Broadway and Central Avenue in northeast Minneapolis is unusual because it is elevated on a bridge over the Great Northern Railway tracks. The current bridge is the third on the site. The first bridge was a timber trestle. It was replaced in 1950 by a concrete and steel structure.

Demolishing the old bridge meant breaking the streetcar line on Central. Usually this would have required TCRT to run a shuttle car between Broadway and the outer end of the line in Columbia Heights. Passengers would have to walk across the construction site to transfer to another streetcar for the rest of the trip to downtown.

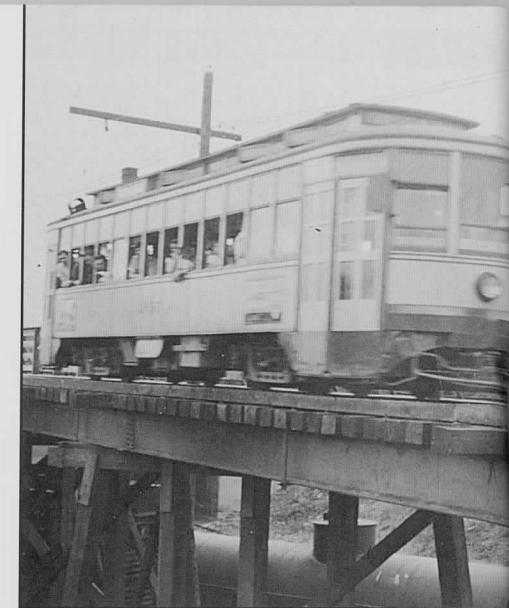
In this case, TCRT didn't own enough double-ended cars to run such a shuttle, and the isolated track would have prevented access to any carhouse for servicing. Instead, a shoofly with a temporary single-track trestle was built along the east side of Central, permitting through service to continue. At each end of the shoofly, prefabricated portable switches guided the cars onto and off of the regular track. It was probably one of the most expensive pieces of temporary track ever built by TCRT.



Looking north at the start of demolition of the old bridge



This is the south approach to the construction site. Portable switches transitioned to the temporary shoofly bridge.



The completed ramp to Broadway



TCRT CARRIES THE MAIL

-Aaron Isaacs

TCRT carried more than passengers. According to Russ Olson, beginning in 1891, twelve cars on the Interurban were equipped with mail boxes similar to original small U. S. Mail street corner boxes. Made of sheet iron, they were fastened to the right hand front of the cars convenient to passengers as well as persons who wanted to deposit mail without boarding. Each car carried an American flag and was lettered on the side U. S. Mail. Mail boxes were painted the same color as the streetcar. They were emptied at both ends of the line by postal agents. By 1894, all streetcars operating in Minneapolis and St. Paul were equipped with mail boxes.

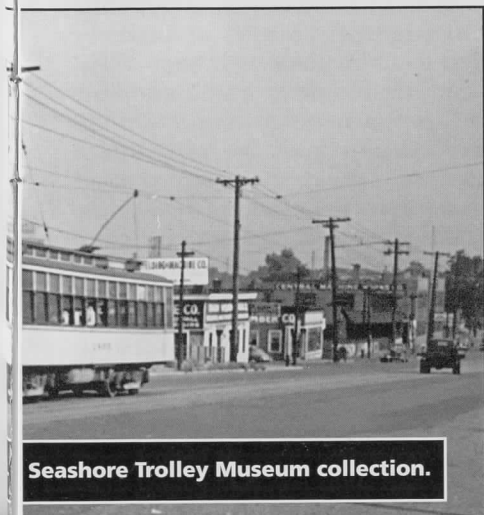
A search of the MSM archive fails to show any single truckers with mail boxes or U. S. Mail lettering. However, all the 1890s closed double-truckers have the lettering. The mail boxes that appear in photos were hung from the fixed wire-mesh partition at the rear of the car behind the wire gates. Photos show a U-shaped frame mounted on the partition. A ring at the bottom accommodated a lock hasp for security. The inside front cover shows a mail box mounted at that location.

After the turn of the century, the newer double truck standard cars carried the sheet metal mail boxes on the right rear dash just behind the gates. The mail box was hung on a set of brackets attached to the car. These only appear on certain cars, but mail only traveled on certain lines, so clearly the cars were assigned. Photos of the brackets, which were mounted only on gate cars, appear as late as about 1940. No photos have surfaced of one-man cars with the brackets, and it seems safe to assume that none were so equipped.

Until the late 1940s, the streetcars transported mail between local post offices. Although mail handling began



The temporary bridge.



Seashore Trolley Museum collection.

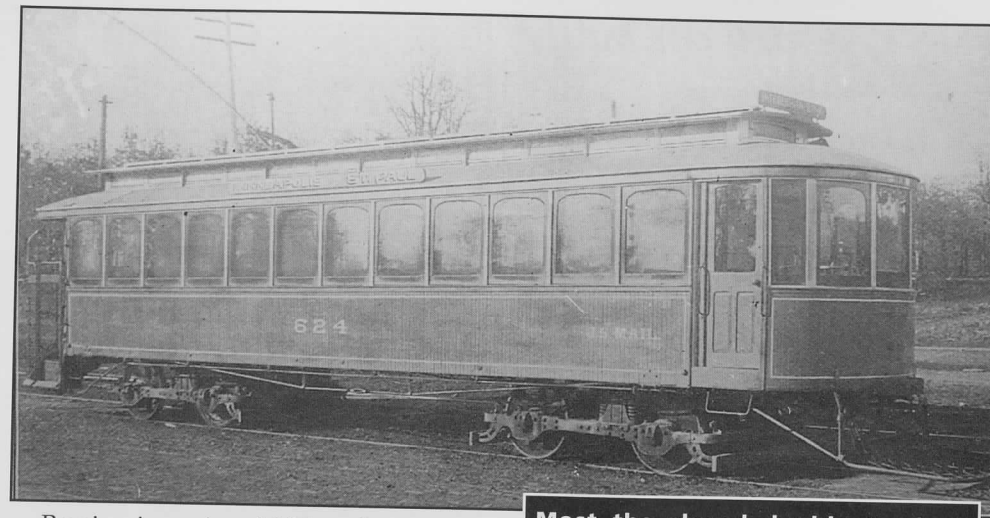


This is a rear view of car #615, built by American in 1892. The U-shaped mail box rack is mounted on the wire mesh partition at right. The box hung from the round cross-pipe at the top of the "U". The brackets on the rear dash supported an oil-fired tail light. Trolley pole retrievers had not yet appeared, so the pole rope was tied to and wrapped around whatever was handy. The gentleman is Calvin Goodrich, Thomas Lowry's brother-in-law who became the company president in 1909.

in the 1890s, MSM's files contain company records that detail the mail routes from 1914 to 1945. The following table lists all the routes, their origins and destinations, mileage and the years of service.

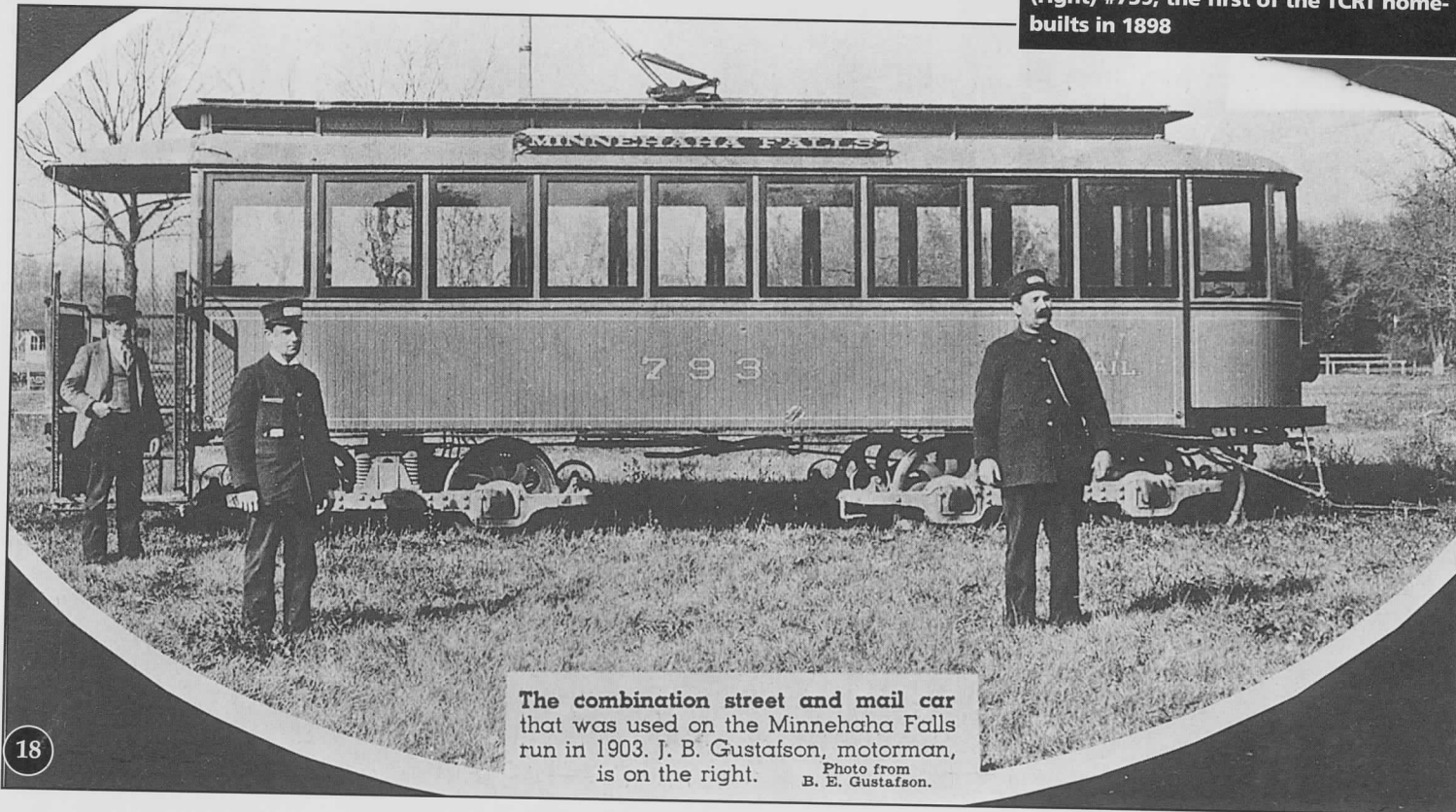
Russ Olson has also seen a reference to a Minneapolis-Oxboro (Bloomington) postal route. It would have used the Nicollet Avenue line and transferred to the Dan Patch line's gas-electric cars at the joint streetcar/ railway depot at 54th and Nicollet.

The shortest routes were less than a mile in length, between two downtown St. Paul post offices, and between two in South St. Paul. The longest routes, not surprisingly, were St. Paul to Stillwater (20.2 miles) and Minneapolis to Excelsior (18.7 miles). It's safe to assume that all of them traveled on regularly scheduled streetcars, with a possible exception.



Beginning in 1905, the Lake Minnetonka line was served by a twice-daily baggage car that carried only baggage and express. Until 1910 it originated in downtown St. Paul, so it may have hauled the mail between the downtowns. Later downtown Minne-

Most the closed double truckers acquired in the 1890s were lettered "U. S. Mail". (Above) #624, built by American Car Company in 1892, (below) #793 Pullman built in 1892 and acquired in 1898 with the purchase of the St. Paul & White Bear Railroad, and (right) #739, the first of the TCRT home-builds in 1898



The combination street and mail car that was used on the Minnehaha Falls run in 1903. J. B. Gustafson, motorman, is on the right.

Photo from
B. E. Gustafson.

apolis was the eastern terminus. Besides traveling the main line from Minneapolis to Excelsior and Tonka Bay, it ran up the Deephaven branch and the short 9th Avenue spur into Hopkins. The Hopkins detour allowed it to connect the Hopkins post office with its Excelsior counterpart.

That mail run ended in 1920. Baggage service ended in 1923. While the baggage car ran, it also likely handled the Minneapolis-Linden Hills, Minneapolis-Hopkins and Excelsior-Tonka Bay pouches.

After checking all the post office locations on a map, it appears that all the mail shipments traveled on a single line-there was no transferring of bags between cars. That remained true until 1938, when a midday shuttle was instituted between Hopkins and the 44th and France loop, where the mail bags were transferred to a Como-Harriet car for the rest of the trip



downtown. The Hopkins-Minneapolis mail run was the last in the system, surviving until the line itself was abandoned in 1951.

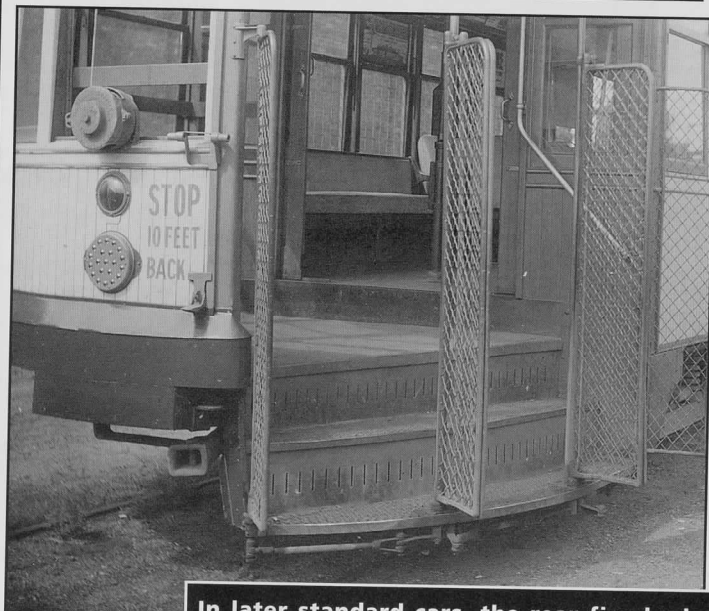
Besides carrying the mail, TCRT carried letter carriers between their home stations and their assigned routes.

Letter carriers didn't deposit money into the farebox. Instead, they were recorded on the trip sheet and the Post Office was billed ten cents a ride, the full cash fare at the time. We have company records for four years in the late-1930s. 1938 was typical. That year the streetcars carried 10,673 postal workers, an average of 35 a day. I believe most traveled within the downtowns, where postal vehicles would be inconvenient. I base this on watching letter carriers take Metro Transit buses from the Minneapolis main downtown post office to their routes in the nearby skyscrapers.

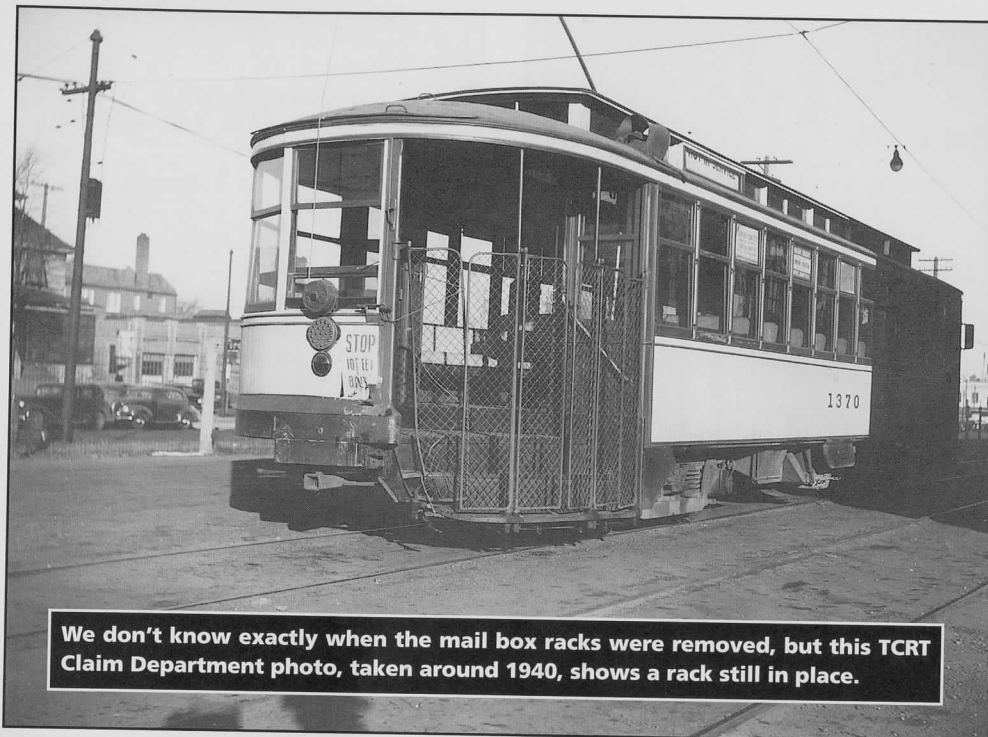
TCRT MAIL ROUTES

From Post Office	To Post Office	Miles	Line	Start	End
St. Paul (5th & Wabasha)	Minneapolis	10.58	Interurban	1914	1933
St. Paul	St. Paul (4th & Market)	.59	Selby-Lake	1914	1919
(Commercial Station, 4th & Wall)	St. Anthony Hill Station				
St. Paul	(Selby & Dale)	2.12	Selby-Lake	1914	1919
(4th & Market)	Merriam Park Station				
St. Anthony Hill Station	(Prior & St. Anthony)	2.59	Selby-Merriam Park	1914	1919
(Selby & Dale)					
Highland Station	N 32nd & Penn	3.24	Penn	1914	1915
(Broadway & Washington)	Camden Station				
Highland Station	(42nd & N. Lyndale)	2.28	N. Washington	1914	1920
	N 32nd & Penn	2.11	Robbinsdale	1914	1915
Robbinsdale	Linden Hills (43rd & Upton)	4.89	Como-Harriet	1914	1920
Minneapolis	North St. Paul	8.03	Mahtomedi	1914	1935
St. Paul (5th & Wabasha)	Stillwater	12.24	Stillwater	1914	1920
North St. Paul	Hopkins	10.0	Hopkins		
Minneapolis			(9th & Excelsior)	1914	1951
	Excelsior				
Hopkins	(2nd & Water)	8.65	Lake Minnetonka	1914	1919
	Tonka Bay	2.94	Lake Minnetonka	1914	1919
Excelsior	Ft. Snelling	5.71	Ft. Snelling	1914	1925
St. Paul	South St. Paul	5.11	South St. Paul	1914	1918
St. Paul	South St. Paul	5.11	South St. Paul	1922	1923
St. Paul	Robbinsdale	4.03	Robbinsdale	1917	1918
Highland Station	Station. A,				
St. Paul (5th & Wabasha)	Como & Carter	6.12	Como-Harriet	1917	1918
	South Park	4.35	South St. Paul	1919	1919
St. Paul	South St. Paul	.76	South St. Paul	1919	1920
South Park	South St. Paul	.76	South St. Paul	1924	1925
Minneapolis	Excelsior	18.7	Lake Minnetonka	1920	1932
St. Paul	Stillwater	20.2	Stillwater	1922	1932
St. Paul					
(Commercial Station, 315 Rosabel)	Merriam Park Station	4.71	Merriam Park	1920	1932
St. Paul	Como Ave Station				
	(Como & Carter)	6.36	Como-Harriet	1920	1936
St. Paul (Commercial Station)	St. Anthony Hill Station	2.65	Dale-Phalen	1922	1923
Minneapolis	Glen Lake	13.1	Lake Minnetonka	1923	1932
Minneapolis, Traffic Station Station	St. Louis Park				
(7th St & 1st Ave. N)	(Lake & Dakota)	6.0	St. Louis Park		
			(3425 Dakota)	1925	1930
Minneapolis, (8th St & 1st Ave N)	Robbinsdale	7.98	Robbinsdale	1926	1936
Bayport	Stillwater	3.72	Bayport	1928	1932
Mahtomedi	Willernie	1.38	Mahtomedi	1930	1932
St. Paul	White Bear Lake	15.7	White Bear Lake	1930	1932
St. Paul	Mahtomedi	13.0	Mahtomedi	1933	1935
North St. Paul	Mahtomedi	5.4	Mahtomedi	1936	1938

Car #945, built in 1902, has the U-rack mounted in the rear. The location is Midway Station at Raymond and University Avenue.



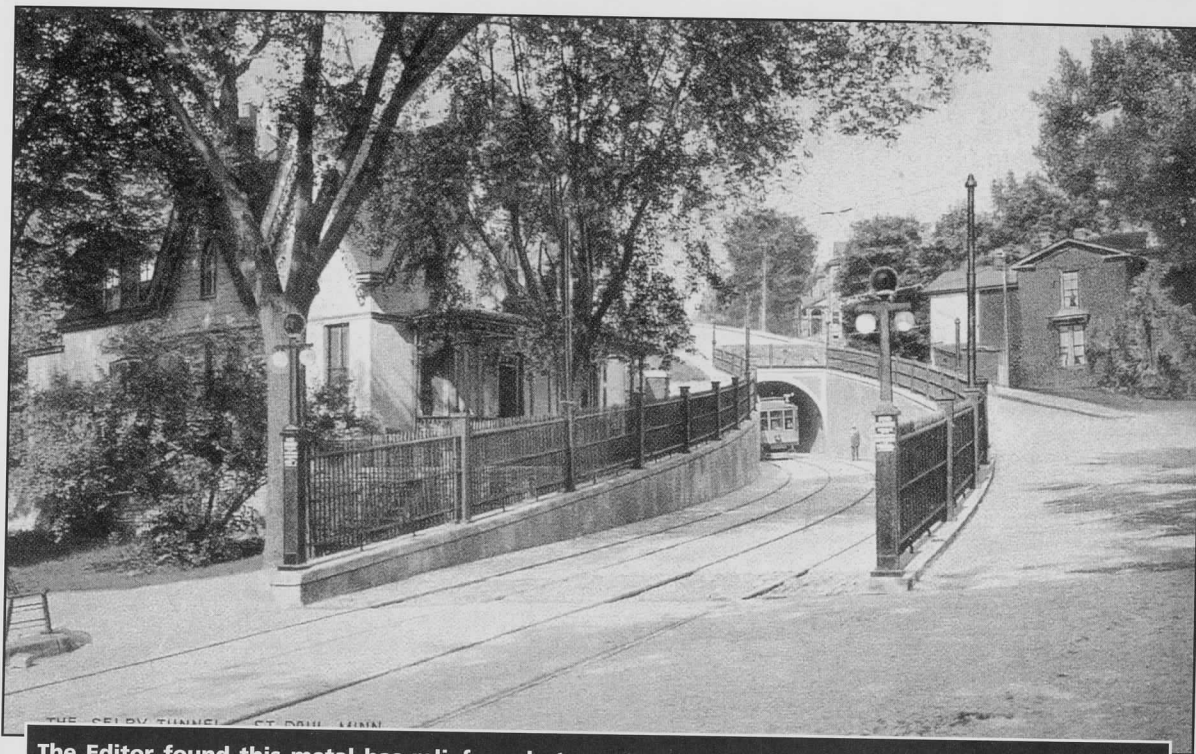
In later standard cars, the rear fixed wire mesh panel didn't exist, so mail box racks of a new two-piece design were mounted on the right rear dash below the window. The top photo shows the brackets. The bottom photo shows the mail box as mounted on the rack.



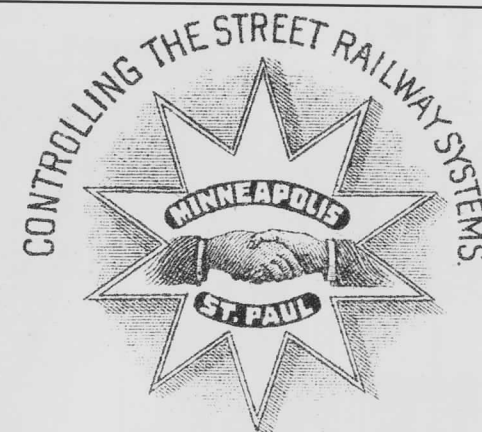
We don't know exactly when the mail box racks were removed, but this TCRT Claim Department photo, taken around 1940, shows a rack still in place.



The last mail hauling contract was between Hopkins and Minneapolis. In later years, the Hopkins midday service was a shuttle car that met the Como-Harriet downtown car at the 44th and France loop, where the mail bags were transferred.



The Editor found this metal bas relief candy tray at an antique store. A quick search through the photo archive revealed that the tray design is a copy of a Selby Tunnel postcard photo. Most unusual.



J. F. CALDERWOOD, Auditor.

TCRT created its familiar logo in 1907.
This is what it replaced.

Inside rear cover: As the owner of five former "chicken coop" streetcar bodies, we know how former streetcars made cheap, instant utility buildings. Here is the first generation of such reuse, a former horsecar used as a waiting shelter. The location of this photo has been the source of much speculation within MSM. The consensus is 46th and Bryant Avenue South, during the 1896-1904 period. The streetcar is clearly a double-ender, which has us puzzled. Perhaps the line was broken for sewer construction and this is a temporary shuttle. The photo turned up during one of John Diers' Community Education streetcar classes at Washburn High School.

Rear cover: It's unclear why, but the Selby-Lake line had some "Sunday Only" car stops, including this one at Lake Street and Oakland Avenue. Note the car stop sign on the pole at left.



